The Eurasia Proceedings of Science, Technology, Engineering & Mathematics (EPSTEM)
ISSN: 2602-3199

The Eurasia Proceedings of Science, Technology, Engineering & Mathematics (EPSTEM), 2024

Volume 30, Pages 90-96

ICBAST 2024: International Conference on Basic Sciences and Technology

Basic Principles of Infection Control and Implementation Strategies

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Abstract: Hand hygiene plays a vital role in controlling infections and ensuring patient safety in healthcare settings. The World Health Organization (WHO) and CDC emphasize the critical role of hand hygiene in patient safety. Research conducted worldwide clearly demonstrates the positive effects of hand hygiene adherence by healthcare workers on patient health. Effective implementation of hand hygiene in healthcare settings is essential for reducing infection rates and ensuring sustainable quality within healthcare systems. However, low adherence to hand hygiene among healthcare workers can lead to the spread of hospital-associated infections. This paper emphasizes the critical role of hand hygiene in preventing infections in healthcare settings and details the strategies proposed to enhance healthcare workers' compliance with hand hygiene. The role of training, observation, feedback, and leadership support is discussed. The aim of this study is to review the current literature on the applicability of hand hygiene in healthcare settings. Literature searches were conducted using academic databases such as PubMed, Google Scholar, Scopus, and Cochrane Library. The search focused on articles published between 2000-2024. This study reviews research assessing the effectiveness of training programs, observation and feedback methods, leadership support, and accessibility to hygiene products in hospital settings. The development and implementation of hand hygiene strategies has significant potential in improving healthcare quality and reducing healthcare-associated infections.

Keyword: Hygiene, Healthcare-associated infections, Infection control, Healthcare engineering.

Introduction

Healthcare-associated infections (HAIs) represent one of the most significant risks to patient safety in healthcare settings. HAIs are widespread in hospitals, clinics, and other healthcare facilities. The World Health Organization (WHO) defines hand hygiene as a fundamental component of infection control in healthcare settings. Proper hand hygiene helps prevent the spread of infections and enhances the safety of healthcare workers, patients, and visitors (Pittet et al., 2009; Boyce, 2021). However, adherence to hand hygiene often faces various challenges, which can contribute to the spread of healthcare-associated infections (Larson et al., 2007). For effective implementation of hand hygiene in healthcare services, strategic planning is required. This planning should not only include training and awareness activities but also incorporate tools such as observation, feedback, and leadership support to encourage healthcare workers' behavior (Pittet et al., 2009; Boyce, 2021). Furthermore, it is crucial to create environments that address barriers such as healthcare workers' workload and time constraints and facilitate easy access to hygiene products. Recent studies have shown that educational programs aimed at increasing hand hygiene awareness, along with observation, feedback strategies, leadership support, and accessibility to hygiene products, effectively improve healthcare workers' compliance with hand hygiene. WHO's 2023 research agenda on hand hygiene highlights its role in preventing infections in healthcare settings.

Method

This study aims to review the existing literature on the applicability of hand hygiene in healthcare services. Literature searches were conducted using academic databases such as PubMed, Google Scholar, Scopus, and Cochrane Library. The search focused on articles published between 2000 and 2024. Keywords such as "hand hygiene", "healthcare-associated infections", "compliance", "education programs", "feedback", "infection control", "hospital hygiene", and "leadership support" were used. The study reviews research assessing the effectiveness of training programs, observation and feedback methods, leadership support, and the accessibility of hygiene products in healthcare settings (Pittet et al., 2009; Boyce, 2021;WHO, 2023).

Importance of Hand Hygiene

Prevents Infections: In hospital environments, bacteria, viruses, and other pathogens can spread easily. Healthcare workers, if they neglect hand hygiene, may transfer these pathogens to patients or themselves.
Increases Patient Safety: Hand hygiene is particularly critical for immunocompromised patients. It is essential in sensitive areas such as postoperative care, intensive care units, and dialysis, where vulnerable patients are at greater risk.
Reduces Cross-Contamination: It prevents the spread of disease-causing agents between different patients. This helps protect both patients and healthcare workers (WHO, 2009).
5 Moments for Hand Hygiene: The "5 Moments for Hand Hygiene" approach identifies critical times when healthcare workers should perform hand hygiene. The World Health Organization (WHO) recommends the following 5 key moments for healthcare professionals to clean their hands:
Before Contact with a Patient: Healthcare workers should wash their hands before direct contact with a patient. This prevents germs from spreading to the patient (Duckro et al., 2005; Hayden et al., 2008; Creamer et al., 2010).
During Contact with a Patient: Hands should be cleaned during direct contact with the patient, for example, when performing an examination or providing care (Hirschmann et al., 2001; CDC, 2002; Loveday et al., 2014).
After Contact with Patient Body Fluids: Hands should be washed after contact with body fluids (e.g., blood, urine, saliva) to prevent infection spread.
After Contact with Environmental Surfaces: Hands should be cleaned after touching surfaces near the patient, such as bed rails, devices, or other equipment.
After Contact with the Patient: Hand hygiene after patient contact helps prevent the spread of microbes to other patients or individuals.

These five key moments are critical for the effective implementation of hand hygiene in healthcare settings (CDC, 2002; WHO, 2009; WHO, 2012; AORN, 2022).

Figure 1. The five ındications for hand hygiene

The Importance of Hand Hygiene in Healthcare

Hand hygiene is emphasized by the World Health Organization (WHO) as a fundamental strategy to prevent the spread of infections in healthcare settings (Pittet et al., 2009). Compliance with hand hygiene is identified as an

effective method for preventing hospital-acquired infections (Boyce, 1999; Kampf, Löffler, & Gastmeier, 2009). However, healthcare workers often exhibit low compliance rates, which can contribute to the spread of healthcare-associated infections (Larson et al., 2007). Improving hand hygiene not only ensures patient safety but also helps healthcare workers protect themselves and their patients from infections. Both WHO and the Centers for Disease Control and Prevention (CDC) highlight the importance of increasing compliance with hand hygiene and have made its implementation mandatory across all areas of healthcare (CDC, 2002; WHO, 2009).

Challenges in Ensuring Compliance with Hand Hygiene

Although hand hygiene is critical for infection prevention and health protection, individuals often face challenges in adopting and adhering to proper hand hygiene practices. These challenges arise across various contexts, from healthcare settings to schools and daily life at home. Several factors impede compliance with hand hygiene in healthcare environments. Among the key factors are heavy workloads, skin irritation caused by antiseptic use, and a lack of awareness regarding the importance of hand hygiene (Larson, 1994; Al-mansour,2021). Overcoming these challenges is essential to promote hand hygiene compliance among healthcare workers. WHO has developed various educational materials, protocols, and compliance assessment tools to increase healthcare workers' awareness about hand hygiene (WHO, 2009; Kilpatrick et al., 2011). The primary factors inhibiting compliance with hand hygiene are outlined below:

Lack of Education and Awareness

A lack of knowledge and awareness about the importance of hand hygiene is one of the leading causes of non-compliance. Many individuals are unaware of the situations in which handwashing is necessary or the correct washing methods. Specifically, incomplete knowledge about the role of hand hygiene in preventing infections can negatively affect individuals' handwashing habits (Larson & Sabin, 2006).

Time Constraints and Workload

In groups with high workloads, such as healthcare workers, time constraints can hinder hand hygiene compliance. In hospitals, for instance, staff are often faced with emergencies, making it difficult for them to find time for handwashing. Additionally, neglect of hygiene in some workplaces can be related to time management issues and external stressors (Pittet et al., 2000).

Infrastructure and Access Challenges

Access to hygiene materials and infrastructure deficiencies pose significant barriers to hand hygiene compliance. A shortage of basic hygiene tools such as soap, water, and disinfectants can make it difficult to maintain proper hand hygiene. This issue may be more pronounced in rural areas or developing countries, where access to hygiene products can be more challenging (WHO, 2009).

Cultural and Social Barriers

Cultural and social norms can influence individuals' compliance with hand hygiene. In some cultures, frequent handwashing may not be considered necessary, or hygiene habits may be shaped by traditional beliefs. Additionally, some individuals may believe that hygiene is only required before becoming sick, rather than as a regular practice (Aunger & Curtis, 2016).

Lack of Motivation and Forgetfulness

Individuals' motivation to comply with hand hygiene practices can be influenced by external factors. For example, people with lower personal health risks may not feel adequately motivated to wash their hands. Moreover, busy work schedules or daily life stress can lead to forgetting or neglecting hand hygiene (Novák et al., 2019).

Incorrect Use or Insufficiency of Hygiene Products

Incorrect use of hygiene products can reduce their effectiveness. For instance, some individuals may believe they have achieved adequate hygiene by simply washing their hands with water, but water alone may not be sufficient to kill microbes. Additionally, improper use of disinfectants can lead to compliance issues (Boyce & Pittet, 2002; Rumano et al.,2022).

Psychological Barriers and Insufficient Awareness

Psychological barriers to hand hygiene compliance also exist. Particularly in high-risk groups, such as healthcare workers, fatigue and psychological stress can negatively affect adherence to hand hygiene. Furthermore, some individuals may fail to fully grasp the importance of hand hygiene or may neglect hygiene rules (Larson et al., 2007). Ensuring hand hygiene compliance is a multifaceted process. Factors such as educational deficiencies, time constraints, infrastructure challenges, cultural influences, lack of motivation, and psychological barriers all present obstacles to this process. Addressing these challenges requires more comprehensive and effective health policies, infrastructure, and educational strategies.

Strategies to Increase Hand Hygiene Compliance

Various strategies have been developed to improve compliance with hand hygiene practices. Education programs are one of the most essential tools for healthcare workers to understand the importance of hand hygiene and incorporate it into their daily practices. Education should not only provide theoretical knowledge but also include practical exercises that aim to change behavior. Furthermore, leadership support is crucial for increasing hand hygiene compliance rates, as strong leadership ensures that hand hygiene remains a continuous priority within healthcare institutions (Gould et al., 2017a). Additionally, observation and feedback methods play a significant role in improving compliance. These methods involve monitoring healthcare workers' hand hygiene behaviors and providing necessary feedback to encourage behavior change. Observations inform employees about correct practices and motivate them to adjust their behaviors (Gould et al., 2017b). Increasing the availability of hygiene products in hospitals and reinforcing hygiene culture in healthcare settings are also key components of this strategy (Pittet et al., 2009). Below are various strategies that can be employed to enhance hand hygiene compliance:

Education and Awareness Campaigns

Education is one of the most important strategies to improve hand hygiene compliance. Regular training for healthcare workers, coupled with materials that encourage compliance, is crucial. Providing this education during orientation and at regular intervals can significantly improve compliance with hand hygiene (Boyce & Pittet, 2002; Fuadi et al.,2024). Public awareness campaigns emphasizing the importance of proper handwashing should also be integrated into schools, hospitals, and community centers (WHO, 2009).

Targeted Behavior Change Interventions

Behavior change theories can be used to improve hand hygiene compliance. These theories offer strategies to help individuals adopt healthier behaviors. Approaches such as Cognitive Behavioral Therapy (CBT), social learning theory, and motivational interviewing can be effective in encouraging proper hand hygiene practices (Larson & Sabin, 2006).

Enhancing Accessibility and Convenience

Making hygiene products (soap, water, disinfectants) easily accessible and user-friendly is essential for improving compliance. In hospitals, schools, and public areas, increasing the number of handwashing stations and making hygiene products more visible can encourage better compliance (Pittet et al., 2000).

Digital Observation and Tracking Systems

Modern hospitals can use sensor-based and camera monitoring systems to track hand hygiene compliance. These systems enable healthcare workers to receive real-time feedback on their hand hygiene practices and evaluate their performance (Sax et al., 2007).

Feedback Mechanisms

Hand hygiene compliance can be increased through regular monitoring and feedback. Setting up systems to track compliance rates and providing staff with regular feedback plays an important role in improving adherence. Such feedback can encourage individuals to be more vigilant and improve their hygiene habits (Dubbert et al.,1990; Boyce & Pittet, 2002; Binyamin; 2022).

Considering Cultural and Social Factors

Hand hygiene strategies should be tailored to cultural and social contexts. Compliance with hand hygiene can be influenced by social norms, traditions, and cultural values. Customizing hygiene programs to fit the cultural characteristics of a community can improve compliance (Aunger & Curtis, 2016; Lee et al.,2019).

Motivational Approaches and Rewards

Using rewards and incentives can motivate individuals to adhere to hand hygiene practices. For example, fun rewards or class competitions can encourage children to be more attentive to hygiene. Reward programs aimed at healthcare workers can also boost compliance in the workplace.

Reminder Materials

In healthcare settings, reminder materials such as posters, flyers, and brochures can help increase awareness and prompt staff to adhere to hand hygiene guidelines (Kampf, Löffler, & Gastmeier, 2009). These strategies can collectively promote better hand hygiene practices and ensure they are sustained over time. Through a combination of education, access to materials, digital monitoring, and cultural sensitivity, hand hygiene compliance can be significantly improved in various environments.

Findings of Research on Hand Hygiene

Recent studies have shown that educational interventions, observation and feedback strategies, leadership support, and the accessibility of hygiene products significantly enhance healthcare workers' compliance with hand hygiene practices. The WHO's 2023 research agenda on hand hygiene emphasizes its crucial role in preventing infections within healthcare settings. Research indicates that hand hygiene training is effective in changing healthcare workers' behaviors and improving hygiene standards in hospitals. Studies conducted by the WHO and CDC found that increased compliance with hand hygiene led to a significant reduction in hospital infection rates (Pittet et al., 2006). Hand hygiene practices are particularly critical in reducing mortality rates among high-risk patient groups.

Raising Public Awareness

Hand hygiene is important not only for healthcare workers but also for patients and visitors. Raising public awareness plays a significant role in controlling hospital-acquired infections. Informational materials can be placed at hospital entrances to educate patients and visitors about the importance of hand hygiene (Sax et al., 2007).

Conclusion

Hand hygiene is an indispensable practice for ensuring patient safety in healthcare services. Enhancing healthcare workers' compliance with hand hygiene is crucial for preventing hospital infections and safeguarding patient safety. Hand hygiene is a simple but effective method in infection control. To improve healthcare workers' compliance, systematic education programs, infrastructure improvements, and digital monitoring systems should be adopted. Regular audits by healthcare institutions and the establishment of a hygiene culture are essential. These measures will contribute to reducing infection rates and improving the overall quality of healthcare services. Adopting proper hand hygiene habits by healthcare workers will help decrease hospital-acquired infections and enhance patient safety. Research on hand hygiene indicates that strategies like training, leadership support, monitoring, and feedback are effective tools for increasing compliance. Improving hand hygiene in healthcare institutions is an important step towards enhancing patient safety. The development and implementation of hand hygiene strategies have the potential to improve healthcare quality and reduce healthcare-associated infections.

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPSTEM Journal belongs to the authors.

Acknowledgements or Notes

* This article was presented as an oral presentation at the International Conference on Basic Sciences and Technology (www.icbast.net) held in Antalya/Turkey on November 14-17, 2024.

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To cite this article:

Erdem, M., Khamdamova, M. & Ozaslan, M. (2024). Basic principles of infection control and ımplementation strategies. *The Eurasia Proceedings of Science, Technology, Engineering & Mathematics (EPSTEM), 30,* 90-96.